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TECHNICAL MANUSCRIPT 581

THE CHERRYPICKER: EQUIPMENT FOR SIMULATING AERIAL SPRAYING

Kenneth D. Demaree
Robert A. Darrow

FEBRUARY 1970

DEPARTMENT OF THE ARMY
Fort Detrick
Frederick, Maryland

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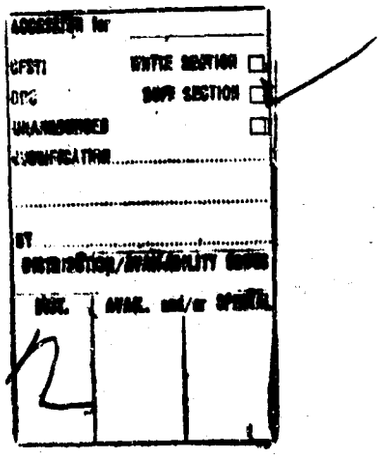

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Plant Physiology Division
PLANT SCIENCES LABORATORIES

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February 1970

THE CHERRYPICKER: EQUIPMENT FOR SIMULATING AERIAL SPRAYING*

ABSTRACT

A truck-mounted sprayer for spraying small wooded plots is described. A hydraulically operated high-lift boom with an operator's bucket is mounted on a 10-ton truck. Separate operational controls for lift and rotation of the boom are located both in the operator's bucket and at the chassis level. The spraying system consists of a 16-foot stainless-steel boom, 1 inch in diameter, basally attached to the bucket by aluminum straps. A 1-gallon pressure container with pressure regulator valve, a source of compressed air, and a control valve complete the unit.

Field evaluation of herbicides, defoliants, and desiccants on woodland or forest vegetation has been conducted by Plant Sciences Laboratories at Fort Detrick with a truck-mounted sprayer or cherrypicker capable of delivering a spray volume simulating that of aerial equipment. This sprayer, with the procedure developed, provides for small-plot testing of chemicals prior to selection and final testing with aerial spray systems. The equipment is capable of overhead spray application to trees and woody vegetation up to 35 feet in height.

The basic mechanical equipment consists of a hydraulically operated high-lift boom with an operator's bucket or platform mounted on a 10-ton truck (Fig. 1). A 16-hp gasoline engine supplies power for the hydraulic system and operates an air compressor unit. In case of emergency or power failure, the boom can be operated from a power take-off unit from the truck engine. The two-section 35-foot boom is mounted on a centrally positioned mast on the truck chassis, with the point of attachment 10 feet above ground level. The entire boom is capable of horizontal rotation beyond a complete circle (400 degrees). The basal segment may be positioned vertically or to 10 degrees below horizontal. The upper segment terminated by the operator's bucket may be positioned at any height from ground level to vertical at 45 feet above ground level, with the accompanying facility for complete horizontal rotation at a constant speed. Separate operational controls for lift and rotation of the boom are located both in the operator's bucket and at the chassis level. When used for spraying, the entire truck unit is held stationary by outriggers extended to maintain stability during rotation or movement of the boom.

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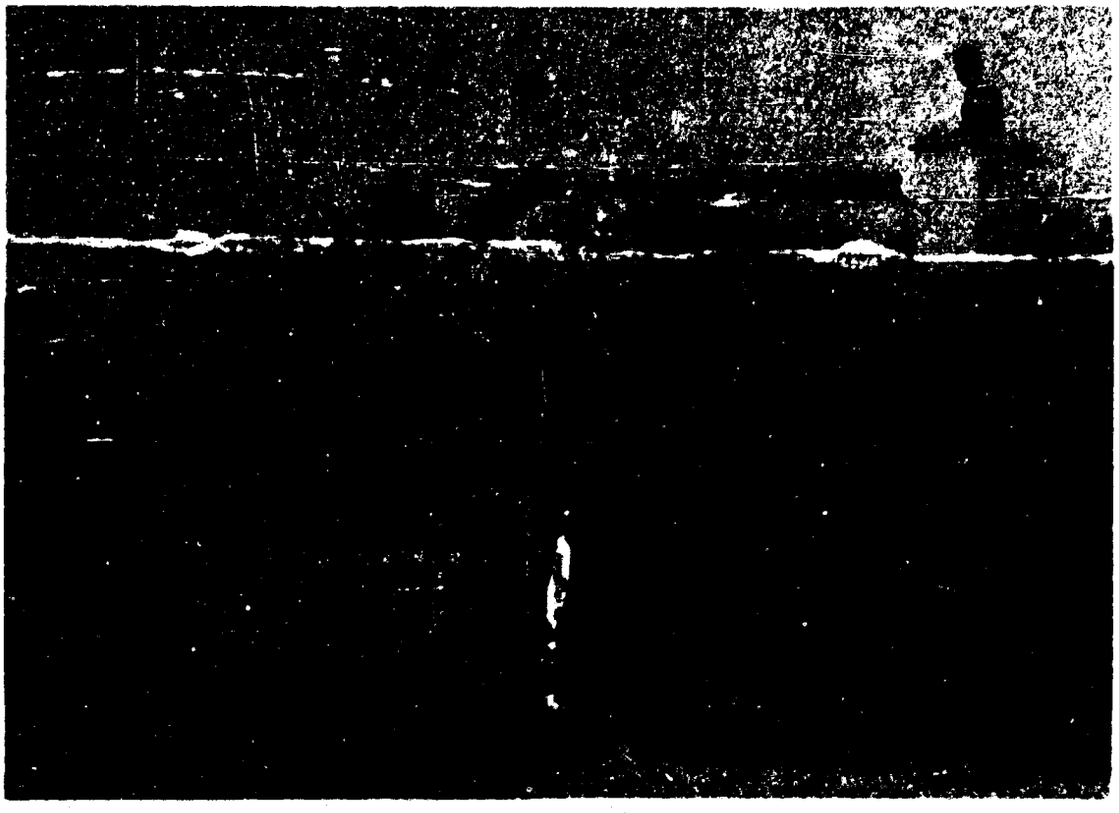

FIGURE 1. The Cherrypicker.

In adapting the equipment for spraying, a multi-nozzle boom is attached basally to the operator's bucket. The spray is applied while the operator's platform rotates horizontally in either a partial arc or complete circle at a suitable height (5 to 10 feet) above the tallest plants. The swath area covered in a single pass will vary with an increase in lateral extension of the operator's platform outward from the central pivotal position. Plot area and deposition rate can be standardized by uniform positioning of the operator's platform at a given lateral distance from the central pivot. Progressively larger nozzle orifices are needed from the innermost to the outer nozzle position on the boom to secure uniform spray distribution.

The spraying system consists of a 16-foot stainless-steel boom, 1 inch in diameter, basally attached to the operator's bucket by aluminum straps. A 1-gallon pressure container with pressure regulator valve, a source of compressed air, and a control valve complete the unit. Compressed air is made available at an attachment on the operator's bucket, supplied from the truck-mounted compressor by hoseline within the high-lift boom.

Preparation of a test site necessitates clearing lanes to permit passage of the truck. If roads or trails are not available, lanes are usually prepared by bulldozing. Plots located on 90-foot centers or at other selected positions may be premarked to facilitate spray application.

The truck is provided with a 300-gallon water tank and an additional 150-gallon tank for diesel fuel. For night spraying, four 750-watt floodlights and a generator are required.

Before spray application, the operator makes a practice sweep at the desired height and distance from the center point, to insure no interference by isolated trees or branches. In the procedure adopted for a circular plot of 2,300 square feet, the boom is positioned to give a central unsprayed area with a radius of 10 feet from the center pivot. The most desirable height of vegetation is 15 to 20 feet, but the vegetation may vary from 5 to 35 feet. If there is an isolated tree higher than the average height in the plot, the operator must rise above the tree, thereby changing the swath pattern.

Efficient test application requires a crew of four men: a driver, a spray operator, a man to mix the chemicals, and a man to extend and retract the outriggers. The spray operator is in command of the vehicle, because he is in a position to see the whole operation. The driver must know where to position the truck when setting up at a new plot site. The chemical mixer must stay at least one compound ahead of the spray operator so that there is always a wash or new compound waiting when the operator comes down. The four men can complete the operation of spraying and the movement of equipment to the next plot location in less than 10 minutes. As many as 90 plots have been sprayed in a single 3-hour period.

This sprayer has several advantages over other types of equipment. The type of spray application is closely equivalent to aerial spraying and has the advantage of requiring fewer personnel, less time, and a smaller test-site area than aerial test applications. With the cherrypicker, more uniform spray patterns may be obtained on tall woody vegetation than with hand booms, clustered-nozzle sprayers, mist blowers, or other ground-based spray equipment used in forest spraying.

If suitable lanes or access routes are available within the test location, the cherrypicker sprayer can be readily transported from one plot location to another at normal driving speeds.

The cherrypicker sprayer is a versatile piece of equipment. In addition to forest spraying, it has been used in spraying canals and canal banks. With its facilities for transport of water, diesel fuel, and compressed air, it has served as a service truck for aerial spray and jeep-mounted spray operations. The truck can also be used as a small crane by attaching a chain to the lower boom segment to lift chemical drums or heavy equipment weighing up to 2,000 pounds.

The principal limitations of the equipment are the requirements for access lanes, a maximum height of 35 feet for vegetation, and a terrain suitable for movement of the 10-ton truck equipment. The system has been used in hilly, flat, sandy, swampy, muddy or dry areas at various locations from New Brunswick, Canada, to Florida and west to Fort Smith, Arkansas. With the spray boom positioned above the tree tops, wind movement may become critical in placing the spray deposit, as with aerial sprayers and most other types of spray equipment.

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13. ABSTRACT

A truck-mounted sprayer for spraying small wooded plots is described. A hydraulically operated high-lift boom with an operator's bucket is mounted on a 10-ton truck. Separate operational controls for lift and rotation of the boom are located both in the operator's bucket and at the chassis level. The spraying system consists of a 16-foot stainless-steel boom, 1 inch in diameter, basally attached to the bucket by aluminum straps. A 1-gallon pressure container with pressure regulator valve, a source of compressed air, and a control valve complete the unit.

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